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Workshop on statistics on the volume of road traffic (vehicle-kilometres)

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**Information on traffic performance on the road and motorway network
in the Czech Republic**

Transmitted by the Government of the Czech Republic

Transport densities and structures serving as a background for transport performance calculation on the road network have already been monitored in the territory of the present Czech Republic since the 1930s.

Currently, such data are obtained by the following techniques:

- 1) National traffic census on the road and motorway network
- 2) Data collection through automatic traffic counters
- 3) Inquiry and directional surveys
- 4) Traffic flow videodetection

ad 1) National traffic census

The national traffic census has been carried out in three to five year's intervals since 1963, and in compliance with European standards in a five-year interval since 1980. As from 1973, the technique applied is more or less the same, and only a specification of the methodology for statistical conversion of obtained selective surveys (conversion coefficients) is taking place.

The national traffic census is carried out on about 8,000 census sections which cover all sections between intersections on class I roads (2000 census sections, 6 150 km), class II roads (4,100 census sections, 14 700 km), on a selected sample of class III roads (1,700 census sections, about 5,500 km of the total length of 34,000 km), and on all motorway sections (587 km). Out of the total of 56,000 km of road and motorway network in the Czech Republic, the total monitored sections amount to 25,500 km.

The census is carried out 10 days in a year (April to October) and it lasts 4 hours, namely in the interval between 07.00h to 11.00h or 13.00h to 17.00h, 7 working days and 3 Sundays. The Ministry of Transport is the guarantor of the traffic census. The methodology and the evaluation is ensured by the Department of Transport Engineering, Road and Motorway Directorate. The traffic data are recorded on census forms and checked by regional organizations of the Road Administration and Maintenance. Thirteen vehicle types are distinguished in the traffic flow (including cycle traffic). Data on pedestrian traffic are no longer monitored.

In order to specify the techniques for calculating Annual Average Daily Traffic (AADT), counting posts are selected (90 posts in 2005) for performing the census in all census days for 16 hours (07.00h – 23.00h), as well as a sample of counting posts (160 posts in 2005) where the census is also performed in the night (23.00h – 07.00h), namely in two census days only (census times in summer days). In this way, the sections where the 16 hours' census, as well as the night census, is carried out provide data throughout 24 hours.

Following the check-up on the initial census forms of "4 hours' census" the data are downloaded to a computer and transmitted electronically to a central database of the Road and Motorway Directorate of the Czech Republic.

The main outputs from the database are the average daily traffic densities and total transport performance on all monitored census sections for all vehicles, particularly for passenger and heavy vehicles. In the last ten years, special attention has been given to heavy vehicle transport which shows enormous transport performance increase. The average daily traffic densities are incorporated into GIS maps and constitute one of the data layer in the Czech Republic's Road Databank administrated by the Road and Motorway Directorate. An official output from the national traffic census is presented in the form of a Final Report.

The Final Report describes all methods used for the calculation of the average daily traffic densities, as well as the conversion coefficients used for the conversion to 24 hours, the impact of summer days, transport characteristics of the working day and of Sunday, and also the comparison of obtained results with theoretical forecasting results based on the census made in preceding periods. Furthermore, traffic performance is analysed, including its increase according to territorial breakdown of the Czech Republic and the traffic flow structure. The Report also describes the correction of growth coefficients for a future period (at present, an outlook for 2030), namely both for the road network and independently for motorways, class I roads, class II roads and class III roads. As an integral part, the Report contains all the background materials in the form of tables and maps (pentlograms) both for the whole Republic, the territorial breakdown and for the situation in all communities with a population over 5,000 (about 300 communities) in the Czech Republic. The national traffic census does not cover the capital city of Prague and the city of Brno.

The national traffic census results are provided to all national and regional road and administrative organizations. For private subjects the data is provided for a charge.

ad 2) Automatic traffic counters

They have been operated since 1963. Currently, about 120 instruments are in service, namely Marksman of Golden River Comp. and ASD3 from the Czech firm Cross Zlín. Of this, there are about 70 counters which can only record the numbers of vehicles, and 50 classifiers capable of distinguishing and recording up to 12 vehicle types according to axle distances. Nowadays, for the purpose of statistical monitoring, 4 intervals are distinguished: up to 500 ccm, up to 900 ccm, up to 1,200 ccm and up to 2,200 of the axle length. Half of the automatic traffic counters enable a remote data download, and as regards classifiers also the regime of monitoring the vehicle speed may be applied here (also in the on-line mode). At this time, the counters are being upgraded – extension by a flash memory having a large capacity of 1 – 2 GB.

Automatic traffic counters are installed, in particular, on all sections between motorway intersections and on most loaded expressway sections, class I roads, and border crossings to the Czech Republic. For methodological reasons 8 automatic traffic counters are in operation also on class II roads. Results from automatic traffic counters serve especially for the calibration of traffic census results (calculation of conversion coefficients) and, furthermore, as underlying materials for designers. Data on speeds are also used for modelling the transport flow behaviour. In the last two years, such outputs are largely used also for the preparation of electronic fee collection (EFC).

Ad 3) The surveys of inquiry and directional surveys according to national vehicle registration plates.

These classic transport-engineering techniques are used to identify the transport flow behaviour, as well as the origin and destination of trips on particular territorial zones and on border crossings. They are also used to specify the national traffic census model for the purpose of calculating average daily traffic densities.

Ad 4) Video-detection

Up-to-date digital and computing technological means having large disc capacities facilitate the traffic flow recording by night and day on digital videocameras and the transfer of the picture into a computer. Such records are subsequently evaluated either manually or through programs for automatic detection of the vehicle type according to its outline. Alternatively, in the case of scanning the national vehicle registration plate, a computer based pattern recognition may be used to identify the vehicle shape and its relation to the vehicle register. Results obtained in this way serve also for the traffic census calibration, and in turn for detailed studies on the traffic flow behaviour and structure and, recently, particularly for the needs of the EFC.

At present, the first 2005 traffic census results are already available. Conclusions have been confirmed concerning a large increase of transport performance of heavy vehicles as from 2000 (increase amounting to about 50%), and particularly as from 2004 (increase of 18%) following the entry into the EU from 2004.

It is a question whether the scheduled EFC implementation in the Czech Republic (from 1 January 2007 as the current date, for vehicles over 12 tonnes for the time being) will bring about the expected absolute reduction in the traffic performance of heavy vehicles. Due to the fact that the Czech Republic is a transit country, both in the North-South direction and in the West-East

direction, it would be a success if the transport performance growth is at least not as rapid as up to this time.

Brief description of the traffic census in Prague

The road transport densities in Prague are currently monitored on an annual basis on the network totalling 788 km. Of the total length of road network amounting to 3 538 km in the capital city of Prague, the monitored network represents 22% only. However, it carries about 80% of the total traffic performance on the territory of the city. It comprises 732 junctions (mainly intersections) and 1,083 sections. For this network, the Transport Engineering Institute (which ensures the traffic census for the municipal authorities of the capital city of Prague) develops every year a cartogram of transport densities for the period of 06.00h – 22.00h of the working day.

The data updating is mainly done with respect to results of manual counting regarding intersections and profiles in the current calendar year. Nevertheless, the results also cover data obtained from detectors on intersections controlled by light signals (equipped by such detectors) and data obtained by means of automatic traffic counters in the relevant year.
